Department of Energy
Ohio Field Office
Fernald Area Office
P. O. Box 538705
Cincinnati, Ohio 45253-8705
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3334

OCT 27 2000

Mr. Gene Jablonowski, Remedial Project Manager
U.S. Environmental Protection Agency
Region V, SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

DOE-0089-01

Mr. Thomas A. Schneider, Project Manager
Ohio Environmental Protection Agency
401 East Fifth Street
Dayton, Ohio 45402-2911

Dear Mr. Jablonowski and Mr. Schneider:

RESPONSE TO THE U.S. ENVIRONMENTAL PROTECTION AGENCY AND OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON SILO 3 PROJECT REMEDIAL DESIGN PACKAGE

References:
1) Letter, G. Jablonowski to J. Reising, "Responses to the U.S. EPA and Ohio EPA Comments on the Remedial Design Package for the Silo 3 Project," September 27, 2000

2) Letter, T. Schneider to J. Reising, "Comments on RTC on the Remedial Design Package for Silo 3," October 4, 2000

This letter transmits responses to the referenced U. S. Environmental Protection Agency (U.S. EPA) and Ohio Environmental Protection Agency (OEPA) comments on the Silo 3 Project Remedial Design (RD) Package.

Enclosed are comment responses, a drawing index, a drawing symbol reference sheet, Piping and Instrumentation Diagram (P&IDs) information that had erroneously been omitted from the RD Package, an air emission model from the Silo 3 headspace, and a revised Transportation and Disposal Plan.

If you have any questions, please contact Nina Akgündüz at (513) 648-3110 or Joanne Lorence at (513) 648-3114.

Sincerely,

Johnny W. Reising

FEMP:Lorence

Johnny W. Reising
Fernald Remedial Action
Project Manager

Enclosures

cc w/enclosures:
T. Schneider, OEPA-Dayton (three copies of enclosures)
F. Hodge, Tetra Tech
M. Schupe, HSI GeoTrans
AR Coordinator, Fluor Fernald, Inc./78

cc w/o enclosures:
S. Fauver, EM-31/CLOV
N. Akgündüz, OH/FEMP
J. Lorence, OH/FEMP
A. Murphy, OH/FEMP
A. Tanner, OH/FEMP
J. Saric, USEPA-V, SRF-5J
R. Vandegrift, ODH
D. Carr, Fluor Fernald, Inc./2
R. Fellman, Fluor Fernald, Inc./2
T. Hagen, Fluor Fernald, Inc./65-2
J. Harmon, Fluor Fernald, Inc./90
S. Hinnefeld, Fluor Fernald, Inc./31
D. Nixon, Fluor Fernald, Inc./52-4
D. Paine, Fluor Fernald, Inc./52-4
T. Walsh, Fluor Fernald, Inc./65-2
ECDC, Fluor Fernald, Inc./52-7

ENCLOSURE: DRAFT RESPONSES TO U.S. EPA GENERAL COMMENTS ON SILO 3 REMEDIAL DESIGN PACKAGE

Piping and Instrumentation Drawings

Commenting Organization: U.S. EPA
Section #: Not Applicable (NA) Page #: NA Line #: NA
Original General Comment #: 1

Comment: The piping and instrumentation drawings (P&ID) included in the submittal are difficult to understand because no legend or list of abbreviations for the drawings has been submitted. The resubmittal should include a legend of all symbols and a list of all abbreviations and instrumentation letter designations used in the drawings to facilitate their review.

Response: A legend of symbols is attached.

Commenting Organization: U.S. EPA
Section #: NA Page #: NA Line #: NA
Original General Comment #: 2

Comment: Some P&IDs appear to be missing from the submittal. It is not clear how many drawings should be included because no index of the drawings has been submitted. The resubmittal should include all required drawings as well as a drawing index.

Response: An index of drawings associated with the Silo 3 Remedial Design Package is attached.

Commenting Organization: U.S. EPA
Section #: NA Page #: NA Line #: NA
Original General Comment #: 3

Comment: The tag names shown on the P&IDs are not entirely consistent with the tag names used in the text. The text and drawings should be reviewed and made consistent in this regard.

Response: A review of the P&IDs and documentation will be performed to ensure all tag names are consistent.

Commenting Organization: U.S. EPA
Section #: NA Page #: NA Line #: NA
Original General Comment #: 4

Comment: A number of valves, dampers, and other devices are shown as being pneumatically operated or controlled. The instrument air system to be used for this purpose will need to be monitored. The P&IDs, however, do not indicate how the instrument air system will be monitored and controlled. In the event that this system fails (that is, instrument air pressure drops), there should be an interlock from a pressure switch to initiate shutdown of all systems that use instrument air for operation or control purposes as well as all systems upstream. System shutdown can be done by the programmable logic controllers (PLC). The P&IDs should be reviewed to ensure that an interlock for emergency shutdown of these systems is included.

Response: P&ID 55-2020 had been erroneously omitted and is now attached and shows the monitors, controls, and interlocks for the instrument air system.

SPECIFIC COMMENTS

Process Control Plan

Commenting Organization: U.S. EPA
Section #: 1.3.1 Page #: 6 Line #: 3
Original Specific Comment #: 1

Comment: The text states that "the following controls may be included. . ." The word "may" should be replaced with the word "will," as it should be known by now what will be included in the local panels.

Response: Text will be revised to read as follows, "the following controls will be included where required for maintenance or local operation..."

Commenting Organization: U.S. EPA
Section #: 1.3.1 Page #: 6 Line #: 6
Original Specific Comment #: 2

Comment: The text states that the limit switches will provide status information to the PLCs. The limit switches should also be used to initiate alarm and shutdown conditions should a valve fail to open or close because of a failure of the instrument air system. Each pneumatically controlled valve should be analyzed for the presence of limit switches, and the controls shown on the P&IDs should be revised accordingly.

Response: All pneumatically operated valves fail in the safe position. The drawings will be reviewed as suggested.

Commenting Organization: U.S. EPA
Section #: 1.5.1 Page #: 13 Line #: 24
Original Specific Comment #: 3

Comment: The text states that the maximum pressure drop across the air conditioning outlet filter will be limited to "0.1" W.G. vacuum." According to the text, the pressure drop will be only displayed on the local indicator. Because the air supply will be drawn from the contamination reduction area and from outside (make-up air), the pressure drop across the filter will increase quickly and will exceed the "0.1" W.G. limit without anyone noticing the exceedance. The monitoring of pressure drop across the filter should be reviewed. An alarm may also be required to support maintenance or replacement of this filter. Also, revised PLC control or monitoring may be required if air balance will be affected. The P&IDs should be revised accordingly.

Response: The current P&ID 55-2017, shows pressure differential indicator transmitter (PDIT) units for measuring differential pressure across the pre-filter and the HEPA filter units. The typo will be corrected to read "1.0" "W.G." for the prefilter and 3"W.G. for the HEPA filter. Note A/C unit has been revised fo 100% recirculation.

Commenting Organization: U.S. EPA
Section #: 1.5.3 Page #: 15 Line #: 4
Original Specific Comment #: 4

Comment: The text refers to the "Retrieval Enclosure Inlet Control Damper (CV-708)." However, P&ID No. 55-2003 does not show damper CV-708. The damper shown on the drawing is tagged FCV-708. The drawing or text should be revised to correct this discrepancy.

Response: The proper tag designation for the Flow Control Valve is 74-DA-001. The drawing will be modified to be consistent with the text.

Commenting Organization: U.S. EPA
Section #: 1.5.3 Page #: 15 Line #: 6
Original Specific Comment #: 5

Comment: The text refers to the "Retrieval Enclosure Inlet Control Damper" as FCV-708. It is unclear whether this damper is the same as the one discussed in Item 4 (see Original Specific Comment No. 4). The text should be revised to clarify this matter.

Response: The text is referring to the same item as in comment no. 4. The text will be modified to clarify this matter. Proper designation for the damper is 74-DA-001. P&ID 55-2003 is being revised to show this change.

Commenting Organization: U.S. EPA
Section #: 1.5.3 Page #: 15 Line #: NA
Original Specific Comment #: 6

Comment: The note at the end of this section refers to control dampers CV-708 and CV-775. These dampers, however, are not shown with these tags on the P&IDs. The control dampers shown on P&IDs are tagged as FCV-708 and FCV-775. The text and drawings should be reviewed and revised as necessary to eliminate these discrepancies.

Response: The proper tag designations for these Flow Control Valves are 74-DA-001and 75-DA-001. The drawing will be modified to be consistent with the text.

Commenting Organization: U.S. EPA
Section #: 1.5.4 Page #: 15 Line #: NA
Original Specific Comment #: 7

Comment: This section describes the treatment system start-up sequence. However, it is not clear whether the startup sequence will be performed manually or initiated by the PLC. The text suggests that the sequence will be performed manually. Because the PLC will be used for process control, the PLC should initiate the startup sequence to avoid operator errors and save time; this will not be very difficult because the emergency shutdown is initiated by the PLC (see Section 1.5.7). The text and P&IDs should be revised accordingly.

Response: The text will be modified to clarify that the PLC/HMI (human machine interface) will be used for normal startup sequences.

Commenting Organization: U.S. EPA
Section #: 3.8.1 Page #: 55 Line #: NA
Original Specific Comment #: 8

Comment: The text refers to P&ID No. 55-2020; however, this drawing is missing from the submittal. As a result, Section 3.8, Plant Air System, cannot be reviewed at this time. The resubmittal should include the required drawing for review.

Response: P&ID 55-2020 was inadvertently left out of the previous submittal and is now attached.

Commenting Organization: U.S. EPA
Section #: 3.10.1 Page #: 60 Line #: NA
Original Specific Comment #: 9

Comment: The text states that the plant water system is shown on P&ID No. 55-2019; however, this drawing is missing from the submittal. The plant water system cannot be reviewed without this P&ID. The resubmittal should include the required drawing for review.

Response: P&ID 55-2019 was inadvertently left out of the previous submittal and is now attached.

Piping and Instrumentation Drawings

Commenting Organization: U.S. EPA
Section #: 55-2003 Page #: NA Line #: NA
Original Specific Comment #: 10

Comment: This drawing shows a "vendor package," which includes an air-cooled water chiller. However, no interlocks are shown with this equipment. Typically, water temperature is monitored in such a system. Additionally, it is not clear how the chilled water pump and the chilled water flow rate will be controlled. Based on the drawing, it appears that the chilled water flow rate is not controlled. If this is the case, the temperature of the air leaving the chilled water coil heat exchanger may fluctuate, creating unnecessary pressure fluctuations in the return air ducting. The water chiller system should be reviewed in light of these issues and modified accordingly.

Response: The cooling system will be a standard, commercially available unit supplied with internal control and instrumentation by the vendor. Specification of the internal control and instrumentation would require a special design, which is not desired. Interfaces between the equipment and the system (such as flow switches, temperature transmitters, etc.) will be depicted on the P&ID's with the appropriate interfaces to the PLC.

The cooling water loop is intended to be a constant flow loop with modulation of the supply water temperature by modulation of the capacity of the cooler. However, the intent of the circuit is the amount of heat added to the silo rather than in maintaining a constant temperature setpoint. In essence, the air temperature returning to the silo is designed to run slightly above ambient temperature. The cooling system will be purchased to prevent the temperature of the air leaving the chilled water coil heat exchanger from fluctuating and creating unnecessary pressure fluctuations in the return air ducting.

OHIO EPA COMMENTS ON
SILO 3 REMEDIAL DESIGN PACKAGE, RESPONSE TO COMMENTS

Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Pg #: 1 Line #: Code: C
Original Comment #: 1

Comment: Will the disposal facility return the 55-gallon drums to FEMP?

Response: The drums will not be returned to the FEMP by the disposal facility. If the waste is shipped to Envirocare for disposal, the contents of the drums will be emptied and the drums will be crushed for burial along with the waste. If the waste is shipped to the Nevada Test Site (NTS) for disposal, the drums will be buried in tact.

Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Pg #: 2 Line #: Code: C
Original Comment #: 4

Comment: As the response is stated, there is no mechanical means for clearing a potential blockage between the Filter Receiver and the Rotary Valve. OEPA recommends that a "clean-out" of some type be added to the design to clear potential blockages.

Response: A 12-inch square inspection port is provided on the lower section of the filter receiver. A slide gate will be provided above the rotary valve to isolate the valve from the receiver hopper section. This valve addition will be added to P&ID 55-2003.

Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Pg #: 11 Line #: Code: C
Original Comment #: 42

Comment: The original comment requested that the unabated release of radon during initial establishment of airflow be modeled using an appropriate short-term model. Please provide the isopleths generated from this model during "worst case" scenario (i.e., highest concentration to the public). Precautions should be made during establishment of airflow such that exposure to the public from the radon release be minimized.

Response: Comment acknowledged. Initial penetration of the Silo 3 dome, and establishment of air flow from the silo headspace to the HVAC system, will be accomplished using measures to minimize offsite impact of radon releases. As described in the Operational Environmental Control Plan, flow to the HVAC system will be established through a connection hot-tapped into the center manway prior to accessing the silo headspace. This initial flow will maintain a slightly negative pressure in the headspace and assure that the release of radon during the initial establishment of airflow will be directed to the Silo 3 exhaust stack through the HVAC system. This flow from the headspace to the HVAC system will be metered such that the exhaust stack radon concentration does not exceed the maximum emission level identified in the Operational Environmental Control Plan steady state operation. Modeling indicates that the maximum hourly average fence-line concentration due to this level of emissions would be 0.21 pCi/l.

As requested in OEPA's comment, a worst case short-term release model of emissions from the Silo 3 headspace was performed using the HOTSPOT plume model developed by Lawrence Livermore National Laboratory (UCRL-MA-106315, March 1994). A summary of the results of this model are attached. Rather than being metered through the Silo 3 exhaust stack using the procedure described above, the worst case model assumed the entire inventory of radon in the Silo 3 headspace (0.15 Ci) was instantaneously released from the Silo 3 stack under worst case meteorology conditions. The model further assumed that the receptor was exposed at the centerline of the entire plume. The maximum offsite impact calculated for this scenario would be a committed effective dose equivalent (CEDE) of 0.19 mrem.

Commenting Organization: **Ohio EPA** Commentor: OFFO
Section #: Pg #: 12 Line #: Code: C
Original Comment #: 45

Comment: Typical design for the removal of sub-micron particulate includes an electrostatic precipitator (ESP) as part of emission control. This design does not include ESP. Sampling and analysis of sub-micron particulate should be included as part of the stack emission monitoring.

Response: The Best Available Technology (BAT) evaluation for control of air emissions from the Silo 3 Project is documented in the Point Source Air Emission Data document (RD Package Section 5.0, Appendix A). This evaluation considered various control technology options, including various filters, dust collectors, and electrostatic precipitators, for treatment of particulate emissions from the Silo 3 Project. The BAT evaluation specifically considered the existence of sub-micron particles in the Silo 3 material and the effectiveness of various control technology combinations in removing these particles and resulting offsite impact. Consistent with the definition of BAT, the evaluation also considered factors such as cost and maintenance requirements.

The evaluation of potential treatment technologies is summarized in Table 1, on page 15 of the Point Source Air Emission Data document (attached). The primary particulate removal technology selected as BAT consists of two stages of HEPA filtration - a HEPA filter with an overall dust arrestance of 99.00% (99.99% at 0.3μ), followed by a ULPA filter with an overall dust arrestance of 99.50% (99.999% @ 0.12μ). These filters are

superior to other technologies evaluated, including electrostatic precipitators, in their ability to remove sub-micron particles.

In order to protect the primary filters from rapid particulate build-up and therefore frequent maintenance, a combination of a roughing filter and an ASHRAE filter is employed upstream of the primary filters to reduce the dust loading on the primary filters. Prior to entering the roughing filter, the air stream from the Silo 3 material conveyance system passes through a secondary baghouse equipped with 0.2 micron cartridge filters. This baghouse removes the majority of the dust loading prior to the filters. This combination of equipment proposed in the Silo 3 design provides adequate protection of the primary filters.

In addition to the particulate removal equipment, the design includes continuous stack monitoring to assure that particulate emissions are accurately measured. Instrumentation also includes pressure instrumentation to assure detection of, and automatic response to plugging or breakthrough of one of the filters.

As presented in the operational Environmental Control Plan, the proposed emission control system provides sufficient removal of radionuclide particulate emissions to result in an maximum effective dose equivalent of 3x10-4 mrem/yr, which is 0.003% of the NESHAP Subpart H standard. The evaluation summarized above demonstrates that the proposed system satisfies the requirements of BAT.

Index of Remedial Design Package Drawing

Drawing Number	Title	Revision
55-2000	Retrieval and Conveyance PDF	2
55-2001	Treatment System PFD	2
55-2008	Gas Treatment HVAC PFD	2
55-2010	Process Bldg. Ventilation PFD	2
55-2018	Reject System PFD	2
53-3130	Gantry General Arrangement Plan	2
53-3131	Gantry General Arrangement Elevations	2
53-3230	Gantry General Arrangement Sections	2
53-3230	General Arrangement Process Bldg. Elev. 578'-0"	2
53-3231	General Arrangement Process Bldg. Elev. 586'-10"	1
53-3232	General Arrangement Process Bldg. Elev. 601'-7"	1
53-3233	General Arrangement Process Bldg. Sections	2
53-3410	General Arrangement Off-Gas Treatment	1
94X-5500-G-02259	Radon Monitor Locations Silos Area Location Plan	B
55-2003	Retrieval and Conveyance P&ID	2
55-2004	Material Feed System P&ID	2
55-2005	Briquette Making P&ID	2
55-2006	Process Water Recycle P&ID	2
55-2009	Air System/Off-Gas Treatment P&ID	2
55-2011	Retrieval/Treatment HVAC P&ID	2
55-2012	Recycle Reject System P&ID	2
55-2015	Additive Feed System P&ID	1
55-2016	Packaging P&ID	1
55-2017	Process Bldg. HVAC P&ID	1
55-2019	Fire Water & Plant Water P&ID	1
55-2020	Air Utilities P&ID	1
57-2302	Control System Block Diagram	2
57-2307	Instrumentation, Symbols, Legend and General Notes	1
SK-1056	Radiological Air Monitoring Locations Sketch	

57-2307

INSTRUMENTATION SYMBOLS:

- FIELD MOUNTED INSTRUMENT
- FRONT OF PANEL MOUNTED
- AUXILIARY PANEL MOUNTED
- REAR OF PANEL MOUNTED
- SHARED DISPLAY, SHARED CONTROL FIELD MOUNTED
- SHARED DISPLAY, SHARED CONTROL FRONT OF PANEL MOUNTED
- SHARED DISPLAY, SHARED CONTROL AUXILIARY PANEL MOUNTED
- SHARED DISPLAY, SHARED CONTROL REAR OF PANEL MOUNTED
- COMPUTER FUNCTION FIELD MOUNTED
- COMPUTER FUNCTION FRONT OF PANEL MOUNTED
- COMPUTER FUNCTION AUXILIARY PANEL MOUNTED
- COMPUTER FUNCTION REAR OF PANEL MOUNTED
- PROGRAMMABLE LOGIC CONTROL FIELD MOUNTED
- PROGRAMMABLE LOGIC CONTROL FRONT OF PANEL MOUNTED
- PROGRAMMABLE LOGIC CONTROL AUXILIARY PANEL MOUNTED
- PROGRAMMABLE LOGIC CONTROL REAR OF PANEL MOUNTED
- INSTRUMENTS SHARING COMMON HOUSING
- FIELD MOUNTED LIGHT
- PANEL MOUNTED LIGHT
- HARDWIRED INTERLOCK OR SEQUENCE
- PLC CONTROLLED INTERLOCK
- INTRA DRAWING CONNECTION

- PROCESS MATERIAL/FLOW SOURCE OR DESTINATION
- PROCESS DATA/FLOW SOURCE OR DESTINATION
- MATERIAL CHUTE SOURCE OR DESTINATION
- PIPE IDENTIFIER

VALVE OPERATORS

- MOTOR OPERATOR
- SOLENOID ACTUATOR
- DUAL ACTION SOLENOIDS

SENSORS–TEMPERATURE

- TW–THERMOWELL
  TE–SINGLE SENSOR, NO THERMOWELL
- THERMOMETER W/WELL
- FILLED SYSTEM W/WELL
- SURFACE MOUNTED TEMPERATURE SENSOR

SENSORS–FLOW

- THERMAL TYPE FLOW ELEMENT
- FLOW SIGHT GLASS PLAIN, PADDLE, FLAPPER
- RESTRICTION ORIFICE PLATE, CAPILLARY TUBE, MULTI–STAGE
- FLOW STRAIGHTENING VANES
- FLOW TRANSMITTER WITH INTEGRAL ORIFICE ASSY.
- FLOW TRANSMITTER, DIFFERENTIAL PRESSURE TYPE WITH FLANGE TAPS ELECTRONIC TYPE SHOWN
- ORIFICE PLATE IN QUICK CHANGE FITTING
- SINGLE PORT PITOT TUBE OR PITOT VENTURI TUBE
- AVERAGING PITOT TUBE
- ROTAMETER
- VENTURI TUBE

LINES

- INSTRUMENT SUPPLY OR PROCESS PIPING
- PNEUMATIC SUPPLY
- ELECTRICAL
- DATA LINK
- DIRECTION OF FLOW

SENSORS–PRESSURE

- STRAIN GAGE TYPE
- DIRECT CONNECTED
- WITH DIAPHRAGM SEAL, PIPED
- WITH DIAPHRAGM SEAL, LINE, OR, EQUIPMENT, MOUNTED

SENSORS–ANALYSIS

- FLOW–THROUGH TYPE
- MOISTURE DETECTOR TRANSMITTER
- LEVEL TRANSMITTER
- LEVEL SWITCH

MISCELLANEOUS COMPONENTS/EQUIPMENT

- FAN
- RECIPROCATING PUMP
- PUMP
- STRAINER
- INSTRUMENT WELL
- ORIFICE PLATE
- KNIFE GATE
- NEEDLE VALVE
- SWING CHECK VALVE
- GATE VALVE
- BALL VALVE
- GLOBE VALVE
- BUTTERFLY VALVE
- PLUG VALVE
- FOUR–WAY VALVE
- THREE–WAY VALVE
- BALL VALVE W/ ACTUATOR
- HOSE CONNECTION
- SELF–CONTAINED PRESSURE REGULATING VALVE
- PRESSURE RELIEF VALVE
- FLOAT VALVE
- RELIEF VALVE
- FIRE STANDPIPE INLET
- FIRE HYDRANT
- SCREW CONVEYOR
- ROTARY VALVE
- FILTER RECEIVER
- LOSS–IN WEIGHT MOTORIZED FEEDER
- PALLET JACK
- FORKLIFT
- FILTER MODULE
- VAPOR/PARTICLE CAPTURE HOOD
- FLOW CONTROL DAMPER WITH PNEUMATIC ACTUATOR
- FLOW CONTROL DAMPER WITH MANUAL ACTUATOR
- FLOW CONTROL DAMPER WITH MOTORIZED ACTUATOR
- HOPPERS (OR)
- BIN ACTIVATOR
- RECIPROCATING COMPRESSOR W/ INTEGRAL RECEIVER
- MULTIPLE SAMPLE CONTAINER INDEXER
- MAINTENANCE BOTTLE
- SUBMERSIBLE PUMP
- MIXER
- ROUGHING FILTER
- ASHRAE 95% FILTER
- HEPA FILTER (95% TO 99.99%)
- PERISTALTIC PUMP
- HAMMERMILL
- MOTORIZED CONVEYOR (ROLLER OR BELT)
- AIR CYLINDER
- DRAG CONVEYOR
- PNEUMATIC CYLINDER ACTUATED VALVE
- DRUM PUSHER (AIR CYLINDER)
- LABEL PRINTER
- BARCODE READER
- SPOOL PIECE
- FROST PROOF YARD HYDRANT
- FLEXIBLE CONNECTOR
- TANK
- CR SCREEN
- SCREW FEEDER
- IN–LINE FILTER
- BIN VENT
- OPEN TANK (OR)
- JIG CRANE
- DRUM LID REMOVE HANDLING EQUIPMENT
- DRUM UNLOADER
- BULK MATERIAL TOTE
- SHELL AND TUBE HEAT EXCHANGER

REFERENCE DRAWINGS

DRAWING NO.	TITLE

NOTES

3334

GENERAL NOTES

1. THE INSTRUMENT LEGEND IS BASED ON ISA STANDARDS. THE COMPONENT FUNCTIONAL IDENTIFIER FOR AN INSTRUMENT CONSIST OF LETTERS DERIVED FROM THE INSTRUMENT LEGEND SHEET AND THESE NOTES. THE FIRST LETTER IS SELECTED ACCORDING TO MEASURED OR INITIATING VARIABLE. SUCCEEDING LETTERS IDENTIFY FUNCTIONS PERFORMED. MODIFYING LETTERS MAY BE USED TO MODIFY EITHER A FIRST LETTER OR SUCCEEDING LETTERS AS APPLICABLE.

[K] A - Conforms to the Subcontract Requirer
[ ] B - Minor Comment - Incorporate and Rel
[ ] C - Revise and Resubmit
SIG: Karen Wing Date: 10/3/0

REV	DATE	BY	CKD	DESCRIPTION
0	5/12/00			REVISED TECHNICAL BASELINE

SILO 3 PROJECT
FEMP

INSTRUMENTATION, SYMBOLS, LEGEND AND GENERAL NOTES

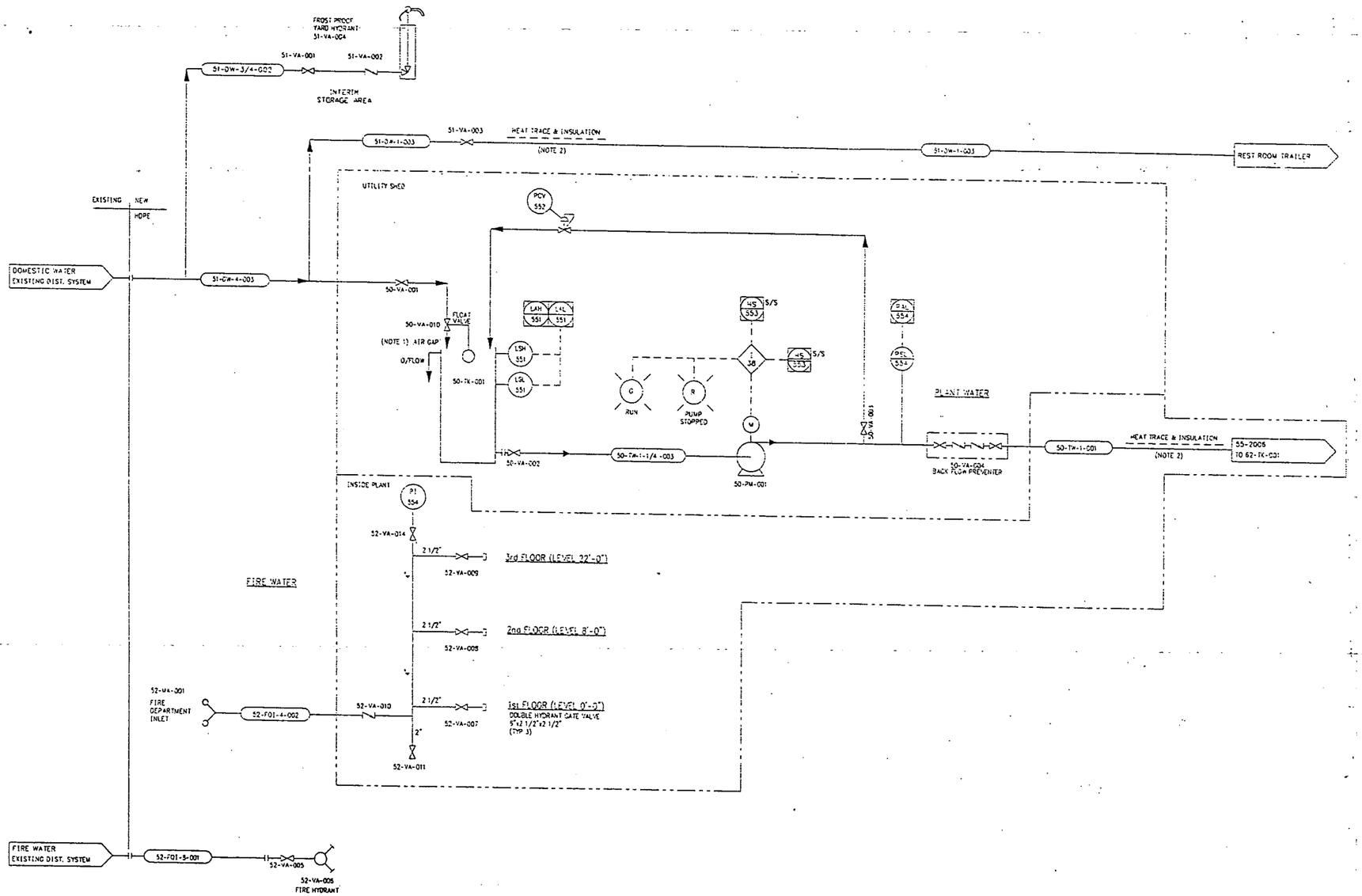
RMRS

SCALE: NONE		
DRAWN: B. THOMAS		DATE: 5/12/
DESIGNED: N. KORTEKAAS	Nicholas C Kortekaas	DATE: 5/12/
CHECKED: D. HORN	Donald Horn	DATE: 5/12/
VERIFIED:		DATE:
APPROVED:		DATE: 5/1
CADD FILE NAME: 57-2307.0		
O-LEVEL (Y/N): N/A		
DRAWING NUMBER:	57230707	

000012

55-2019

50-TK-001	50-PM-001
PLANT WATER FEED TANK	PLANT WATER PRESSURE PUMP
550 GAL.	10 GPM, 100 FEET OF HEAD 1 HP, 480V



REFERENCE DRAWINGS

DRAWING NO.	TITLE
55-2006	PROCESS WATER RECYCLE P&ID

NOTES

1. AIR GAP INSTALLED PER SPECIFICATION SECTION 15060 PROCESS AND UTILITY PIPING.
2. HEAT TRACE AND INSULATE ABOVE GROUND PLANT WATER AND DOMESTIC WATER PIPING OUTSIDE OF UTILITY SHED.

3334

Q-LISTED ITEMS ON THIS DRAWING

ITEM NO.	DESCRIPTION	Q-LEVEL
52-FOI-4-002	STANDPIPE	3

NOT FOR CONSTRUCTION

REV	DATE	BY	CKD	DESCRIPTION
1	5/12/00	CAB	DPH	REVISED TECHNICAL BASELINE
0	4/21/00	CAB	DPH	REVISED TECHNICAL BASELINE FOR REVIEW

SILO 3 PROJECT
FEMP

FIRE WATER & PLANT WATER P&ID

000013

RMRS Rocky Mountain Remediation Services, L.L.C. ...protecting the environment

SCALE: NONE	
DRAWN: B. THOMAS	DATE: 4/21/
DESIGNED: C. BOSSARD	DATE: 4/21/
CHECKED: D. HORN	DATE: 4/21/
VERIFIED:	DATE:
APPROVED:	DATE: 5/11/
CADD FILE NAME: 55-2019	
Q-LEVEL (Y/N)? Y	

55-2020

40-FL-002	40-CM-001A/B	40-ME-001	41-ME-001A/B	11-TK-001	40-FL-001
INST. AIR COALESCING FILTER	PROCESS AIR COMPRESSOR	INSTRUMENT AIR DRYER	BREATHABLE AIR SYSTEMS	AIR RECEIVER	INSTRUMENT AIR FILTER
50 cfm	50 cfm, 100 psi 25HP, 480V	50 cfm 3/4HP, 120V	20 cfm	10.5 cu. ft. 110 psi	50 cfm

VENDOR PACKAGE (1 OF 2)

COMPRESSOR RUNNING
COMPRESSOR STOPPED
VENDOR CONTROL PACKAGE
40-MTR-001A
40-VA-048A
40-VA-007A
40-VA-009A
40-VA-008A
40-VA-010A
40-CM-001A
DRN
40-VA-318A
40-PA-2-001
40-FL-002
FROM 40-CM-001B
40-VA-012
40-VA-011
40-VA-013
40-VA-014
40-VA-015
40-VA-016
40-ME-001
40-VA-017
40-FL-001
40-VA-049
40-VA-050
40-VA-051
40-VA-052
40-PA-2-002
40-1A-2-001
40-1A-1-002
(NOTE 1) HEAT TRACE & INSULATE
PIPE BRIDGE, GANTRY & HEADHOUSE PLANT AIR HEADER
TREATMENT AREA PLANT AIR HEADER
TREATMENT AREA INSTRUMENT AIR HEADER
40-VA-021
PLANT / INSTRUMENT AIR

VENDOR PACKAGE
41-ME-001A

41-VA-001A
41-VA-002A
41-VA-003A
41-VA-004A
41-VA-005A
41-VA-006A
41-VA-007A
41-VA-044A
41-VA-009A
40-VA-008A
41-SA-2-001A
TIE IN FOR NON-ROUTINE MAINTENANCE.
TREATMENT PLANT BREATHABLE AIR SYSTEM
TREATMENT PLANT LEVELS 0, 8, 22 FT.
BREATHABLE AIR CYLINDERS
AIRLOCKS
3rd FLOOR (LEVEL 22'-0")
2nd FLOOR (LEVEL 8'-0")
1st FLOOR (LEVEL 0'-0")

VENDOR PACKAGE
41-ME-001B

41-VA-001B
41-VA-002B
41-VA-003B
41-VA-004B
41-VA-005B
41-VA-006B
41-VA-007B
41-VA-044B
41-VA-009B
40-VA-008B
41-SA-1-001B
TIE IN FOR NON-ROUTINE MAINTENANCE.
GANTRY HEADHOUSE BREATHABLE AIR SYSTEM
BREATHABLE AIR CYLINDERS
AIRLOCK

40-VA-001
40-VA-003
40-VA-019
40-VA-020
40-VA-026
40-VA-027
11-TK-001
11-TK-002
40-VA-005
40-VA-006
40-VA-004
40-1A-1-003
40-VA-023
40-1A-1-006
40-1A-1-007
40-VA-022
40-VA-024
40-VA-025
FCV-053
FCV-054
TOOL ENCLOSURE
RETRIEVAL PANEL
AIRBORNE RADIOACTIVITY AREA
40-VA-029
40-VA-028
40-VA-030

000014

REFERENCE DRAWINGS

DRAWING NO.	TITLE
-	-
-	-
-	-
-	-

NOTES

1. HEAT TRACE AND INSULATE PLANT AND INSTRUMENT AIR

3334

NOT FOR CONSTRUCTION

REV	DATE	BY	CKD	DESCRIPTION
1	5/12/00	[illegible]		REVISED TECHNICAL BASELINE
0	4/21/00	CAB	DPH	REVISED TECHNICAL BASELINE FOR REVIEW

SILO 3 PROJECT
FEMP

AIR UTILITIES
P&ID

RMRS Rocky Mountain Remediation Services, L.L.C.

SCALE: NONE	
DRAWN: R. OLDS	DATE: 4/21/0
DESIGNED: C. BOSSARD	DATE: 4/21/0
CHECKED: D. HORN	DATE: 4/21/0
VERIFIED:	DATE:
APPROVED:	DATE: 5/1/0
CADD FILE NAME: 55-2020_1.DWG	
O-LEVEL (Y/N): N	
DRAWING NUMBER:	

Hotspot 98 Version 1.0 General Plume

3334

Source Material : Silo 3 radon.mix
Effective Release Height : 18 m
Wind Speed (h=10 m) : 1.0 m/s
Distance Coordinates : All Distances are on the Plume Centerline
Wind Speed (h=H-eff) : 2.65 m/s
Stability Class : F
Receptor Height : 0.0 m
Inversion Layer Height : None
Sample Time : 10.000 min
Maximum Dose Distance : 1.00 km
MAXIMUM CEDE : 1.87E-04 rem

DISTANCE km	C E D E (rem)	TIME-INTEGRATED AIR CONCENTRATION (Ci-sec)/m3	ARRIVAL TIME (hour:min)
0.050	1.5E-26	1.0E-27	00:00
0.100	1.5E-26	1.0E-27	00:00
0.200	1.2E-10	7.9E-12	00:01
0.300	9.1E-07	6.1E-08	00:01
0.400	1.8E-05	1.2E-06	00:02
0.500	6.2E-05	4.2E-06	00:03
0.600	1.1E-04	7.6E-06	00:03
0.700	1.5E-04	1.0E-05	00:04
0.800	1.7E-04	1.2E-05	00:05
0.900	1.8E-04	1.3E-05	00:05
1.000	1.9E-04	1.3E-05	00:06
2.000	1.2E-04	8.1E-06	00:12
4.000	5.5E-05	3.7E-06	00:25
6.000	3.5E-05	2.4E-06	00:37
8.000	2.6E-05	1.8E-06	00:50
10.000	2.1E-05	1.4E-06	01:02
20.000	1.1E-05	7.7E-07	02:05
40.000	6.8E-06	4.6E-07	04:11
60.000	5.2E-06	3.5E-07	06:16
80.000	4.3E-06	2.9E-07	08:22

Hotspot 98 User Mixture Database
User Mixture Name : radon.mix
radon

Nuclide [01] : Rn-222	3.8235d		
Halflife		(Years)	: 1.0475E-02
Inhalation	DCF 50-yr CEDE	(Sv/Bq)	: 1.2000E-08
Submersion	DCF	(Sv-m3)/(Bq-sec)	: 1.9100E-17
Ground Shine	DCF	(Sv-m2)/(Bq-sec)	: 3.8200E-19
Total Activity Released		(Ci)	: 1.5000E-01
Release Fraction			: 1.0000E+00
Deposition Velocity	(cm/sec)		: 0.0000E+00